

Bell Work

26-Jan-2018

Balance the following equation;



How many moles of Aluminum Oxide
are produced from the combustion of
3 moles of Aluminum (think about the
balanced equation and a molar ratio)

What about grams of O₂ needed?

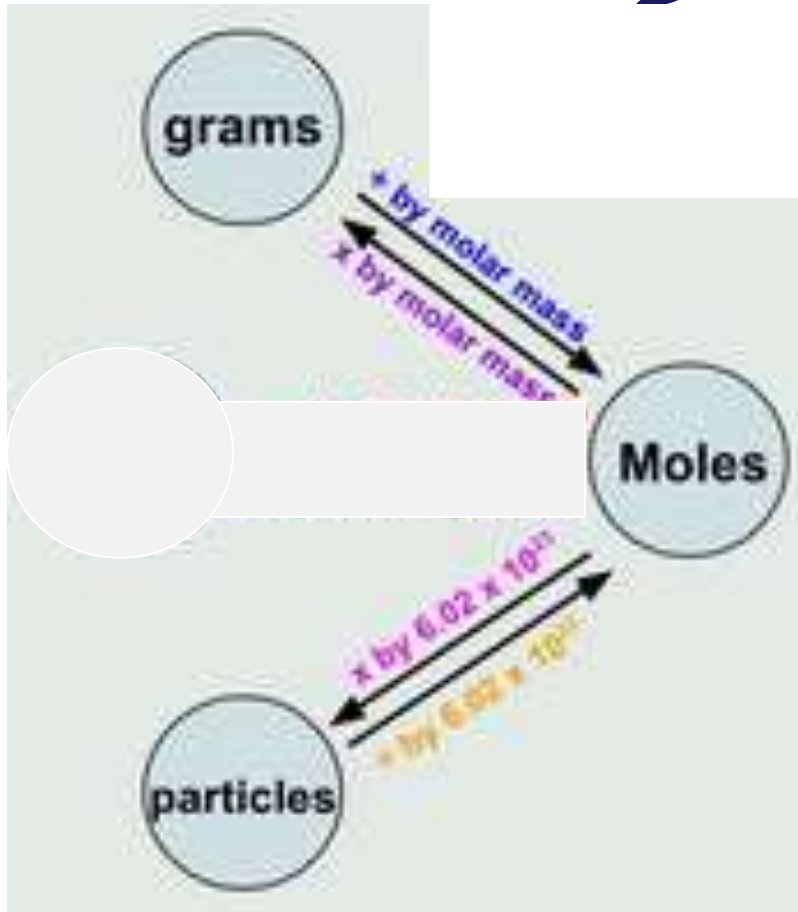


Objective:

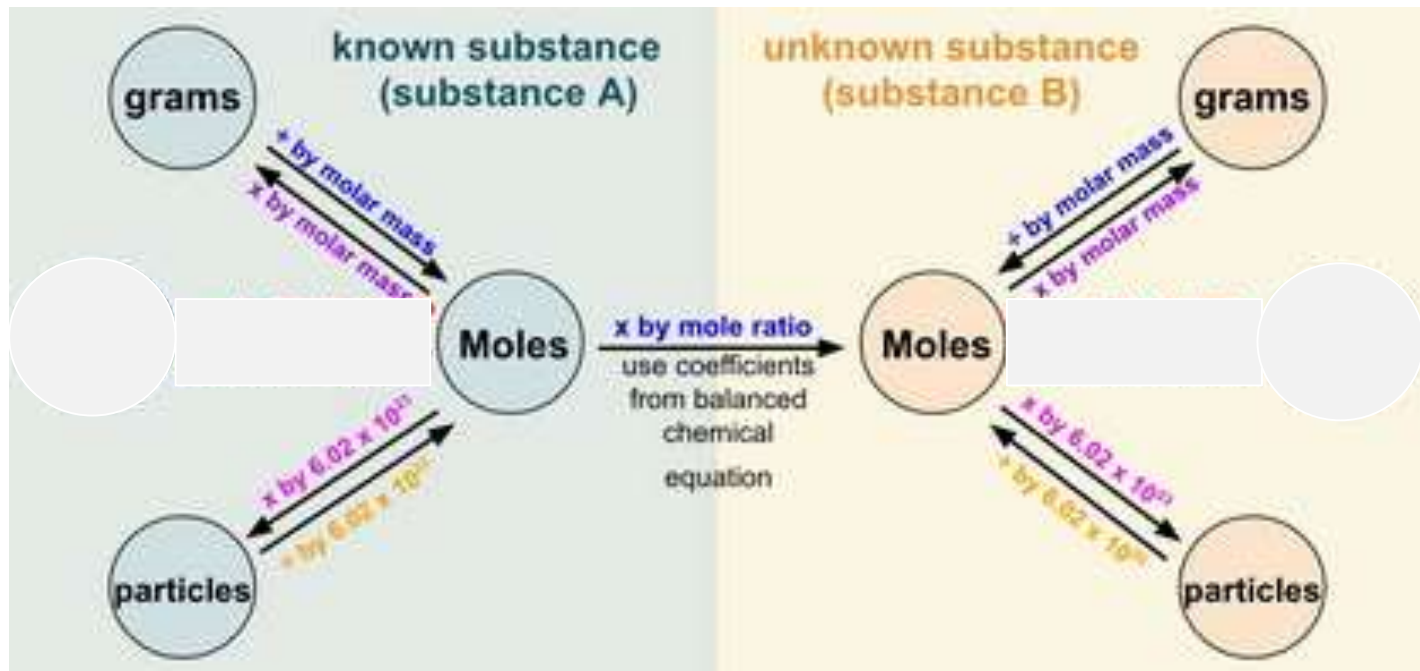
You will be able to set up a mole bridge using a balanced equation.

EQ: After a win on a sports field or an academic assignment what is your next responsibility in order to repeat on the next challenge?

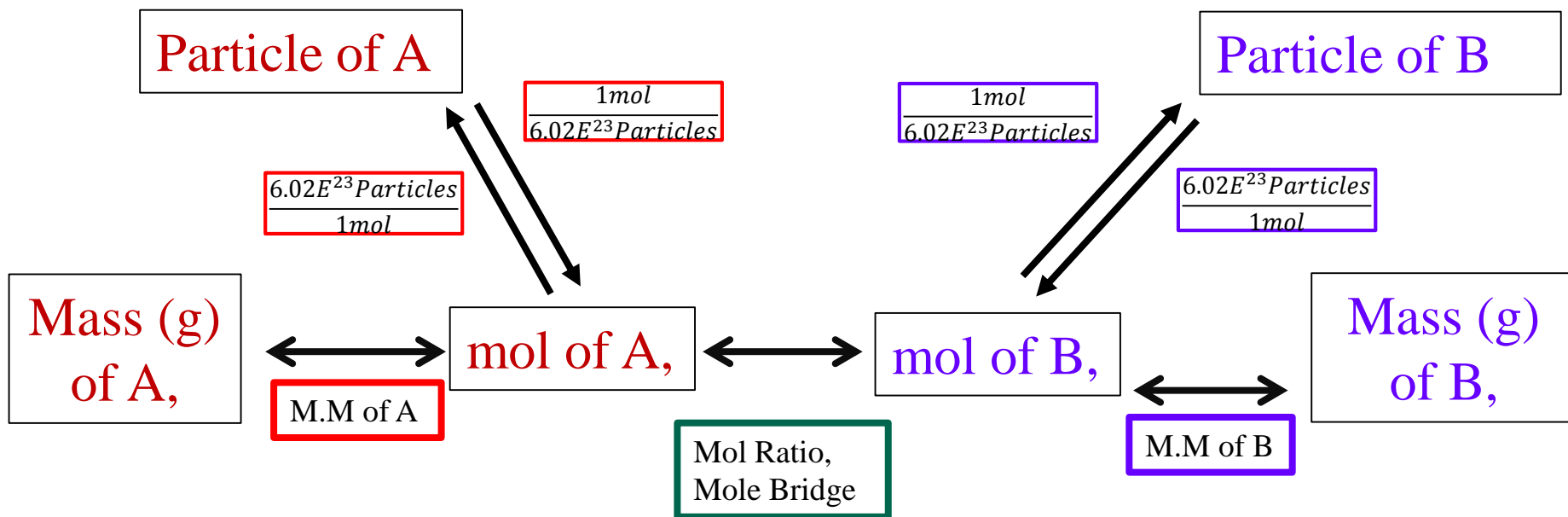
Mole conversion (Same specie)



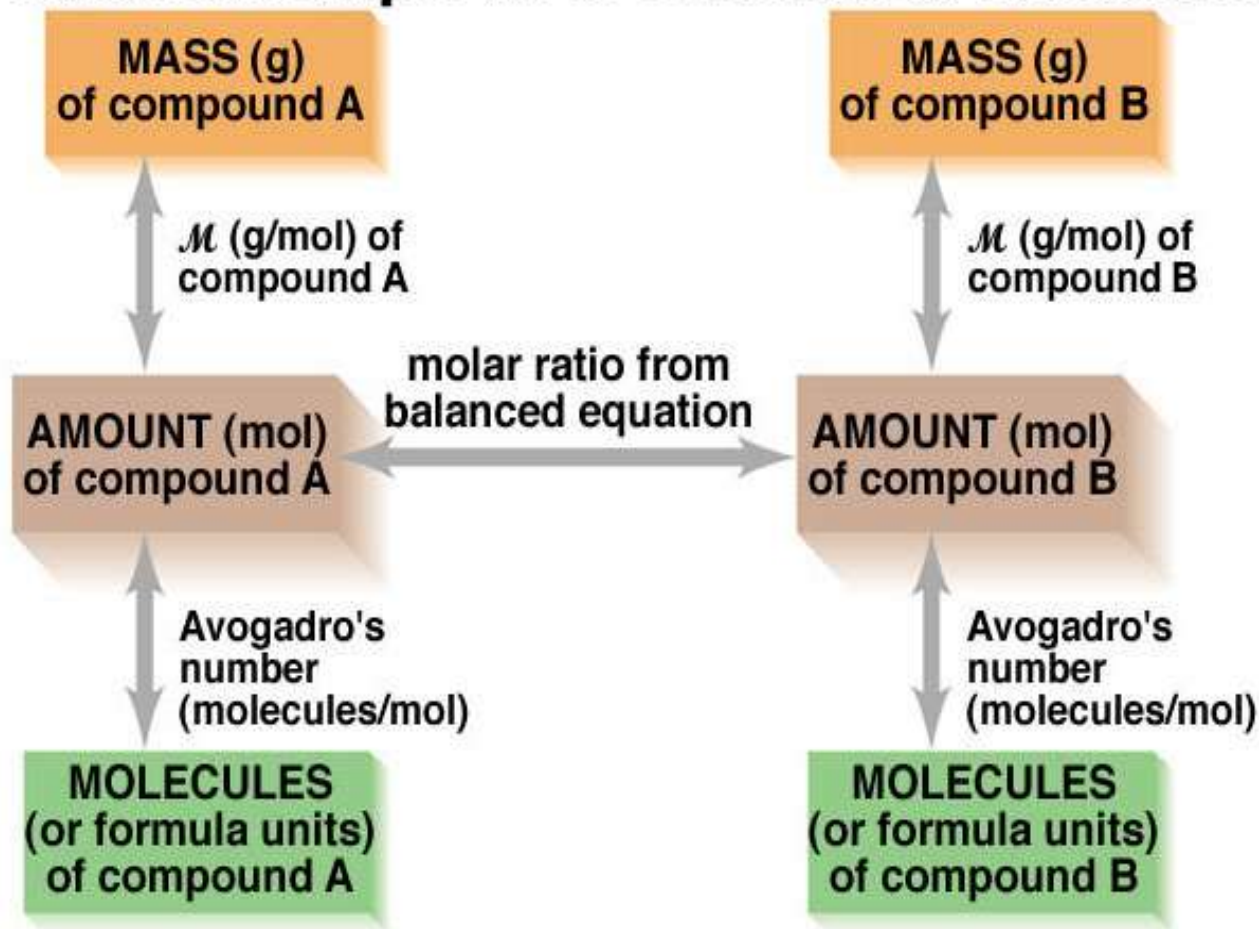
Stoichiometry



Stoichiometry Flow Chart

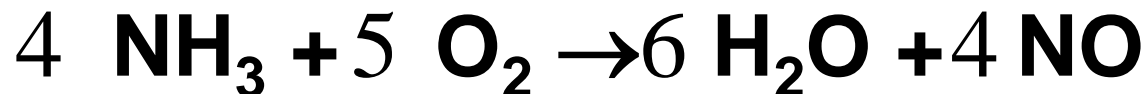


Summary of the Mass-Mole-Number Relationships in a Chemical Reaction



Stoichiometry

Balance the following equation:

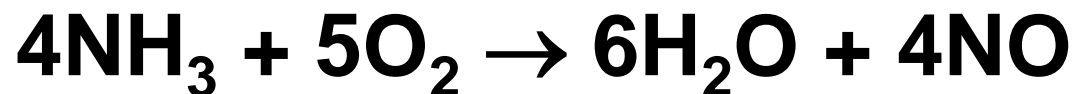


What is the ratio between ammonia and nitrogen monoxide? **4:4 or $\frac{4 \text{ mol NH}_3}{4 \text{ mol NO}}$**

What is the ratio between Nitrogen monoxide and oxygen? **4:5 or $\frac{4 \text{ mol NO}}{5 \text{ mol O}_2}$**

So for every 4 mol of NO you have 5 mol of O₂.

Stoichiometry



So many conversion factors exist:

4 mol NH₃/5 mol O₂, 6 mol H₂O/4 mol NH₃, etc

What if you had 2 mol of NO, how many moles of O₂ would you have?

$$2\text{mol NO} \times \frac{5\text{mol O}_2}{4\text{mol NO}} = 2.5\text{mol O}_2$$

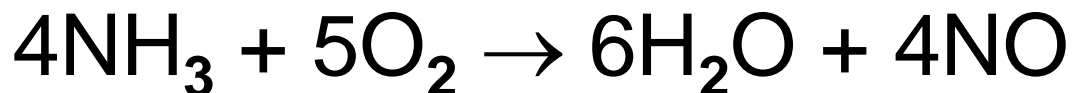
What if you had 6 mol of H₂O, how many moles of O₂ would you have?

$$6\text{mol H}_2\text{O} \times \frac{5\text{mol O}_2}{6\text{mol H}_2\text{O}} = 5\text{mol O}_2$$

Stoichiometry

“Stoichiometry” refers to the relative quantities of moles. It also refers to calculations that make use of mole ratios.

Stoichiometry



Recall also that molar masses provide factors:

$$\frac{1 \text{ mol NH}_3}{17 \text{ g NH}_3}$$

$$\frac{32 \text{ g O}_2}{1 \text{ mol O}_2}$$

Is $\frac{4 \text{ g NH}_3}{5 \text{ g O}_2}$ a conversion factor?

No!

The equation tells us moles not grams.

Stoichiometry Question 1a

Consider : $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

How many moles of H_2O are produced if 0.176 mol of O_2 are used?

$$\begin{aligned} \# \text{ mol H}_2\text{O} &= 0.176 \cancel{\text{ mol O}_2} \times \frac{6 \text{ mol H}_2\text{O}}{5 \cancel{\text{ mol O}_2}} = \\ &0.21 \text{ mol H}_2\text{O} \end{aligned}$$

Notice: A correctly balanced equation is essential to get the right answer

Stoichiometry questions (1b)

Consider : $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

How many moles of NO are produced in the reaction if 17 mol of H_2O are also produced?

$$\begin{aligned} \# \text{ mol NO} = & \cancel{17 \text{ mol H}_2\text{O}} \times \frac{4 \text{ mol NO}}{\cancel{6 \text{ mol H}_2\text{O}}} = \\ & \mathbf{11.33 \text{ mol NO}} \end{aligned}$$

Notice: A correctly balanced equation is essential to get the right answer!

Recall

What is essential to perform stiochiometry?

Stoichiometry questions 1c

Consider : $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

How many moles of NH_3 are needed in the rxn if 0.5 mol of H_2O are also produced?

$$\begin{aligned}\# \text{ mol NH}_3 &= 0.5 \cancel{\text{ mol H}_2\text{O}} \times \frac{4 \text{ mol NH}_3}{6 \cancel{\text{ mol H}_2\text{O}}} \\ &= \mathbf{0.33 \text{ mol NH}_3}\end{aligned}$$



This is what
anhydrous
ammonia will do
to your skin

The “Mole Bridge”

The Mole Bridge is used to convert from one type of compound to another via their molar ratio based on a *Balanced* equation.

You have just converted from one type of compound to another in moles.

Now what if you wanted to go from moles of one compound to grams of another?

The “Mole Bridge”

Now what if you wanted to go from moles of one compound to grams of another?

Moles of A \rightarrow grams of B

$$\cancel{\text{mol A}} \times \boxed{\frac{\cancel{\text{mol B}}}{\cancel{\text{mol A}}}} \times \frac{\text{Molar Mass B}}{\cancel{1 \text{ mol B}}} = \text{grams B}$$

The Mole Bridge



Your Turn

Consider : $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

How many grams of H_2O are produced if 1.9 mol of NH_3 are combined with excess oxygen?

$$\begin{aligned} \# \text{ g H}_2\text{O} = & 1.9 \text{ mol NH}_3 \times \frac{6 \text{ mol H}_2\text{O}}{4 \text{ mol NH}_3} \times \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = \\ & 51 \text{ g H}_2\text{O} \end{aligned}$$

Your Turn

Consider : $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

How many grams of O_2 are required to produce 0.3 mol of H_2O ?

$$\begin{array}{l} \# \text{ g O}_2 = \\ 0.3 \text{ mol H}_2\text{O} \times \frac{5 \text{ mol O}_2}{6 \text{ mol H}_2\text{O}} \times \frac{32 \text{ g O}_2}{1 \text{ mol O}_2} = 8 \text{ g O}_2 \end{array}$$

Before You Go

Write out the steps for completing stiochiometry.

HW:

Read p. 233-237

Work out all examples and complete #28-32

Bell Work, 2-FEB-2018

Complete bell work in your notes because we will be referencing to it next week for a class lab/ demo.

1. Please write the balanced chemical equation for the reaction of **Iron** and **Copper (II) Sulfate**.
2. Why type of reaction is this?
3. What is the mole:mole ratio of Iron to Copper?
4. Cal. the mass of Iron needed to produce 0.60 g Copper.

Objective – you will be comfortable
converting from grams of one substance to
grams of another in a balance equation

Moving along the stoichiometry path

Given: $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

- a) How many moles of H_2O can be made using 0.5 mol NH_3 ?**
- b) What mass of NH_3 is needed to make 1.5 mol NO ?**
- c) How many grams of NO can be made from 120 g of NH_3 ?**



Converting grams \leftrightarrow grams

Notice that we cannot directly convert from grams of one compound to grams of another. Instead we have to go through moles.

Many stoichiometry problems follow a pattern:

$$\text{gram(A)} \leftrightarrow \text{mol(A)} \leftrightarrow \text{mol(B)} \leftrightarrow \text{gram(B)}$$

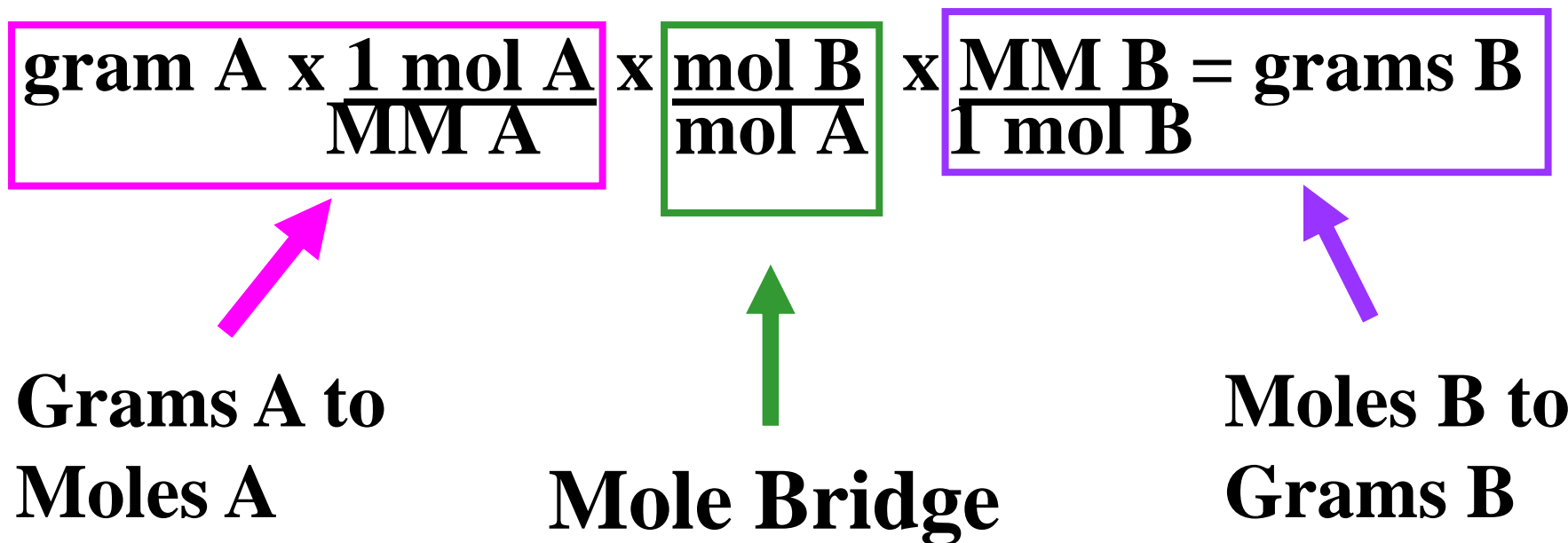
grams of A \rightarrow grams of B

Converting grams \leftrightarrow grams

Many stoichiometry problems follow a pattern:

gram(A) \leftrightarrow mol(A) \leftrightarrow mol(B) \leftrightarrow gram(B)

grams of A \rightarrow grams of B



Your Turn... You need to think a little harder!

Consider : $4\text{NH}_3 + 5\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 4\text{NO}$

**How many grams of NO is produced if
12g of O_2 is combined with excess
ammonia?**

g NO=

$$\begin{aligned} 12 \text{ g } \text{O}_2 & \times \frac{1 \text{ mol } \text{O}_2}{32 \text{ g } \text{O}_2} \times \frac{4 \text{ mol NO}}{5 \text{ mol } \text{O}_2} \times \frac{30 \text{ g NO}}{1 \text{ mol NO}} \\ & = 9.0 \text{ g NO} \end{aligned}$$

Converting grams to grams

grams(A) \leftrightarrow moles(A) \leftrightarrow moles(B) \leftrightarrow grams(B)

We can start anywhere along this path

So, for the rxn $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ what is the path we would take for the following

Given 2 mol H_2O , calculate grams H_2O ?

Moles O_2 required for 36 g H_2 ?

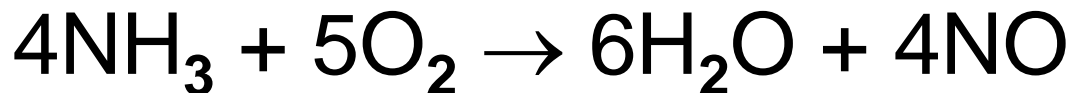
Grams of H_2O produced from 6g O_2 ?

36g

9moles

6.75g

Answers



a)

$$\# \text{ mol H}_2\text{O} = 0.5 \text{ mol } \cancel{\text{NH}_3} \times \frac{6 \text{ mol H}_2\text{O}}{4 \text{ mol } \cancel{\text{NH}_3}} = 0.75 \text{ mol H}_2\text{O}$$

b)

$$\# \text{ g NH}_3 = 1.5 \text{ mol } \cancel{\text{NO}} \times \frac{4 \text{ mol } \cancel{\text{NH}_3}}{4 \text{ mol } \cancel{\text{NO}}} \times \frac{17.04 \text{ g NH}_3}{1 \text{ mol } \cancel{\text{NH}_3}} = 25.6 \text{ g NH}_3$$

c)

$$\begin{aligned} \# \text{ g NO} = \\ 120 \text{ g } \cancel{\text{NH}_3} \times \frac{1 \text{ mol } \cancel{\text{NH}_3}}{17.04 \text{ g } \cancel{\text{NH}_3}} \times \frac{4 \text{ mol } \cancel{\text{NO}}}{4 \text{ mol } \cancel{\text{NH}_3}} \times \frac{30.01 \text{ g NO}}{1 \text{ mol } \cancel{\text{NO}}} \\ = 211 \text{ g NO} \end{aligned}$$

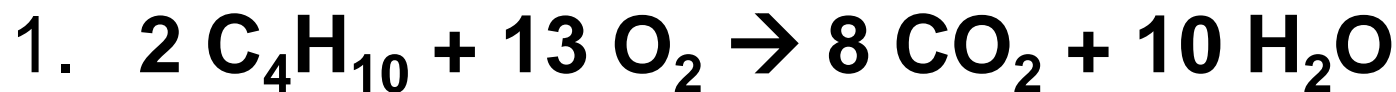
Small Group

Stoichiometry Practice #2,

You will complete Stoichiometry Practice #2
in a small group.

As a team, work out each problem on white
boards, showing all work.

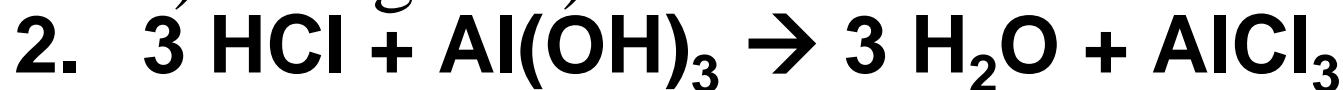
More Stoichiometry Questions



a) What mass of O_2 will react with 400 g C_4H_{10} ?

b) How many moles of water are formed in a)?

a) 1434g b) 34.5moles

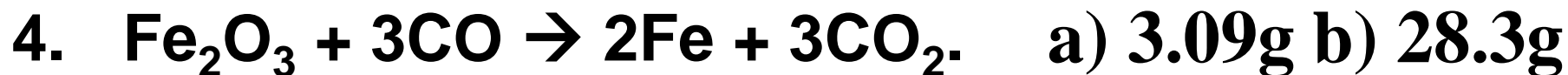


How many grams of aluminum hydroxide will react with 5.3 moles of HCl? 137.8g



What mass of O_2 results from the decomposition of 1.00 kg of calcium chlorate? 466g

Continued



- A) How many moles of carbon monoxide are required to react with 163.0 g of iron(III) oxide?
- B) How many grams of CO_2 are produced from a reaction that also produces 23.9 grams of Fe?



- A) How many moles of copper(II) nitrate can be prepared from 17.0 moles of Cu?
- B) How many grams of copper(II) nitrate can be prepared using 3.8 moles of HNO_3 ?
- C) What mass of water results from the reaction of 8.50 kg of copper metal?

Bell Work

6-Feb-2018

1. Name the following compounds:



2. What are the molar masses of each compound?

3. What do the coefficients in front of species in a balance equation represent?

Agenda

Percent Yield

Finish Lab, Day 1

Objective:

You understand that some reactants run out before others and will be able to determine the limiting reagent in a reaction

Percent Yield

Rxns rarely produce the predicted amount of product from the masses of reactants in the rxn.



An example of this is the rxn of CuSO_4 with Fe. Normally we expect a 1 mol yield of Cu for every mol of Fe reacted. This does not always happen.

Percent yield

If you react 55.8 g of Fe to make Cu, the amount of Cu expected is 1 mol of Cu or 63.5 g of Cu.



Sadly the amount you get will probably be < 63.5g say, 50 g of Cu. The problem is a competing rxn or complexing of a Cu²⁺ ion that happens.

Percent Yield

The Cu^{2+} participating in this “complexing” will not be able to make Cu. The reaction will not yield 100% of the expected Cu.

The amount of Cu produced, ~50 g is only 78.7% and not 100 % of the expected 63.5 g.

Percent yield = $100 \times \frac{50 \text{ g Cu actual}}{63.5 \text{ g Cu predicted}} \rightarrow 78.8\%$

Percent Yield

$$\text{Percent yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \times 100$$

What is the percent yield for a rxn if you predicted the formation of 21 g of C₆H₁₂ and actually recovered only 3.8 g?

$$\text{Percent yield} = 100 \times \frac{\text{3.8 g C}_6\text{H}_{12} \text{ actual}}{\text{21 g C}_6\text{H}_{12} \text{ predicted}} \rightarrow 18\%$$

Percent Yield Practice

When the following rxn is called a mini “volcano”



Balance it

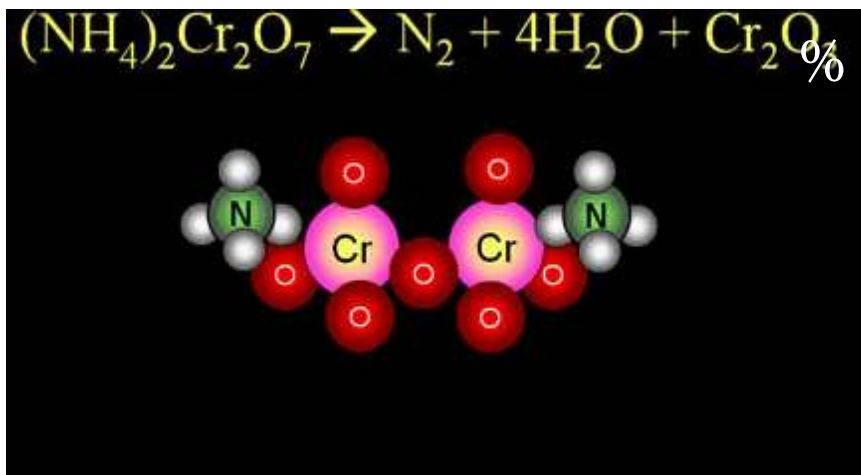
What type of reaction is this?

When 3.0g of the reactant is heated how many grams of the chromium containing product would you expect to get?



Percent Yield Practice

When the following reaction takes place it is called a mini “volcano”



If we actually got 1.1 g of chromium (III) oxide, what is our percent yield?

Bell Work

7-Feb-2018



- If lead (II) nitrate reacts with potassium iodide what are the two products?
- What type of reaction is this?
- Write out a balanced net ionic equation.
- If you have 2moles of lead (II) nitrate how many grams of potassium iodide would you need for a complete rxn?

Objective:

Implement stoichiometry principles to predict actual quantities in a laboratory experiment

To examine theoretical and actual yields in the lab.

Fe/ CuSO₄: Day 1

Safety: CuSO₄ (**CuSO₄ · 5H₂O**) is mildly toxic

Try not to decant any of the solid out of the rxn beaker.



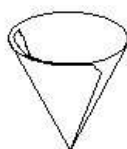
FOLD FILTER PAPER IN HALF



FOLD INTO QUARTERS WITH TOP SECTION SMALLER THAN BOTTOM

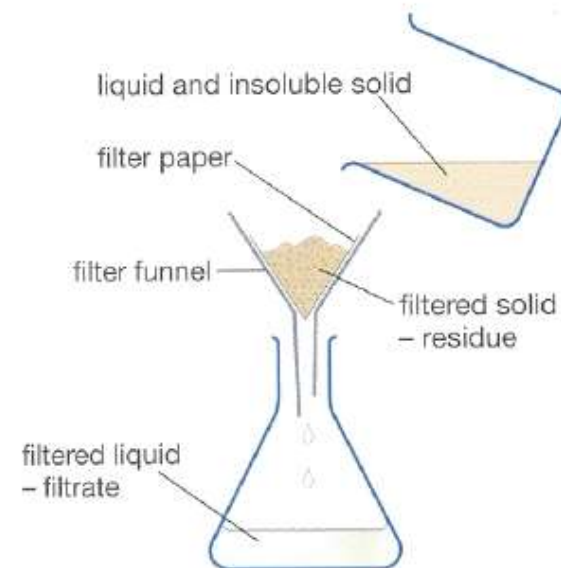


TEAR OFF CORNER OF SMALLER SECTION



OPEN CONE

Label and then weigh the filter paper before filtering



Fe/ CuSO₄: Day 2

Dispose of solid waste in labeled container in hood

Then finish post lab for homework.

EQ: Week four into the new semester...how have you been doing in your goal to do better in this course this semester compared to last? What is one thing you can still improve upon to continue to improve?

Objective:

Use an online program to practice finding limiting reagents

<http://phet.colorado.edu/en/simulation/reactants-products-and-leftovers>

Before you go...

Write four (4) sentences dealing with how you will use stoichiometry to solve chemical calculations and the steps involved with stoichiometry in your own word W/O looking at your notes.



Bell Work, 14-Feb-2017

- a. What does the term “limiting” mean?
- b. What is “non-limiting”?**
- c. When you are finished please goggle up and weight your product from the “Fe/ CuSO_4 ” lab. Dispose of solid Cu filter paper in bag in fume hood.
- d. Clean all glassware and then wash your hands,**
- e. Sit back down with your goggles at your desk ☺.

Agenda

**S'mores limiting reagent stiochiometry
lab**

Objective

**You will APPLY your KNOWLEDGE
of Stiochiometry to create a delicious
treat!**

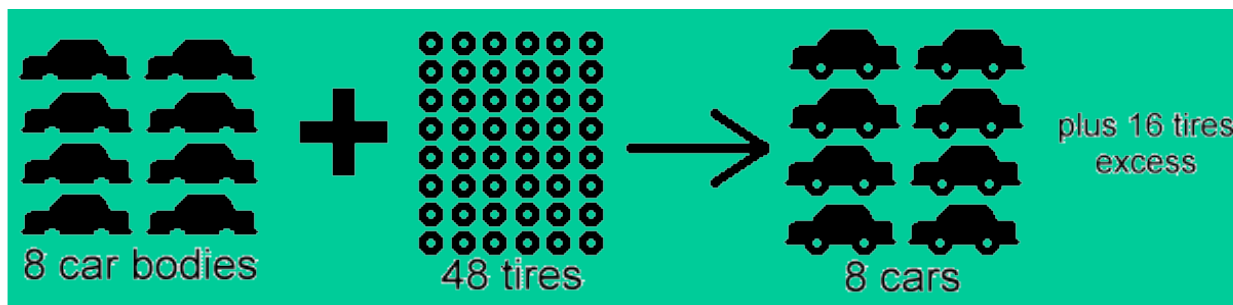
S'mores Lab

You will be making one these in the lab...



S'mores Lab

S'mores are just like stiochiometry and chemistry
you are limited to how many you can make,
through this we briefly look at the concept of
limiting reagent,



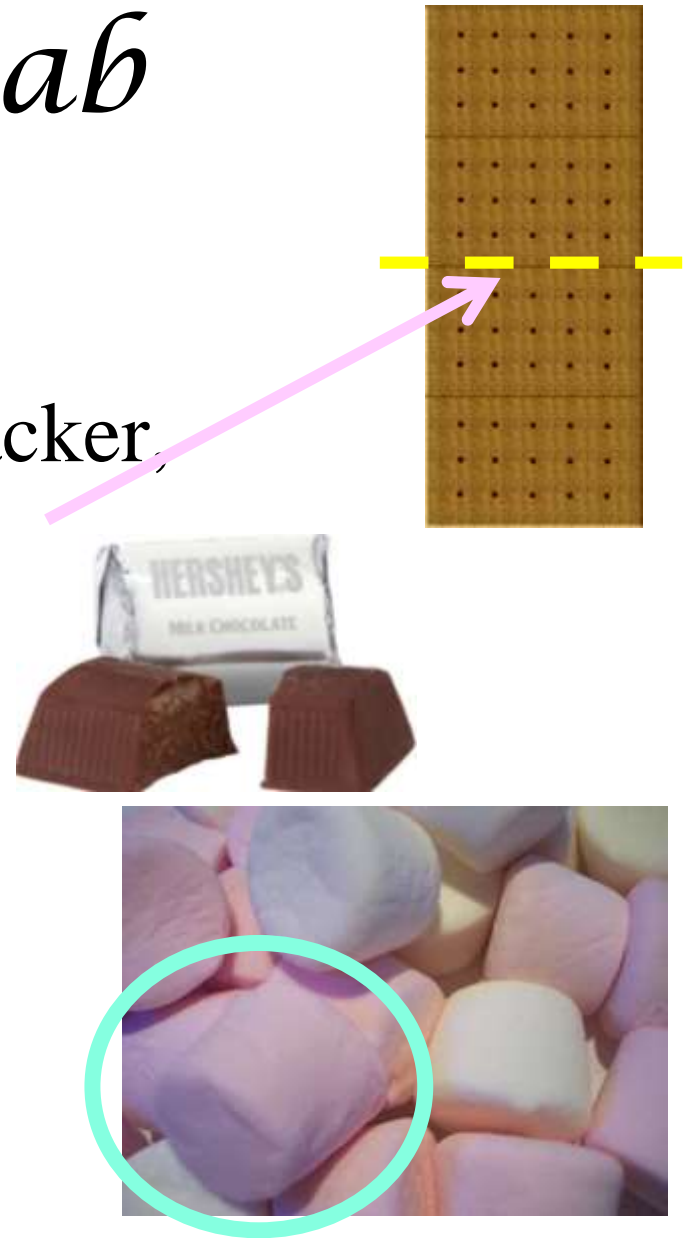
S'mores Lab

A few changes:

You will use one (1) gram cracker,
which you will split in half

ONE (nugget) of chocolate

One marshmallow



What is Due when

Finish “Fe/ CuSO₄” analysis questions
(due 15.Feb.2017)

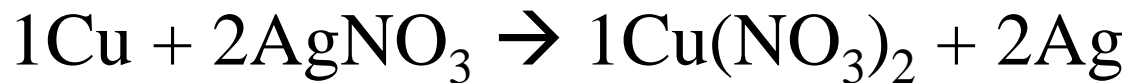
Complete #1-4 in S’mores Lab, save
remainder for later in the week

Worksheet for basic Stiochiometry, turn
in 15.Feb.17

Bell Work

15-Feb-2017

2.0g of both Cu and AgNO₃ are reacted



- (a) How many grams of silver are formed from 2.0 grams of copper?
- (b) How many grams of silver are formed from 2.0 grams of silver nitrate?
- (c) Identify the following in the question above:
 - Limiting reagent
 - Non limiting reagent

EQ: How do limiting reagents impact your daily life?

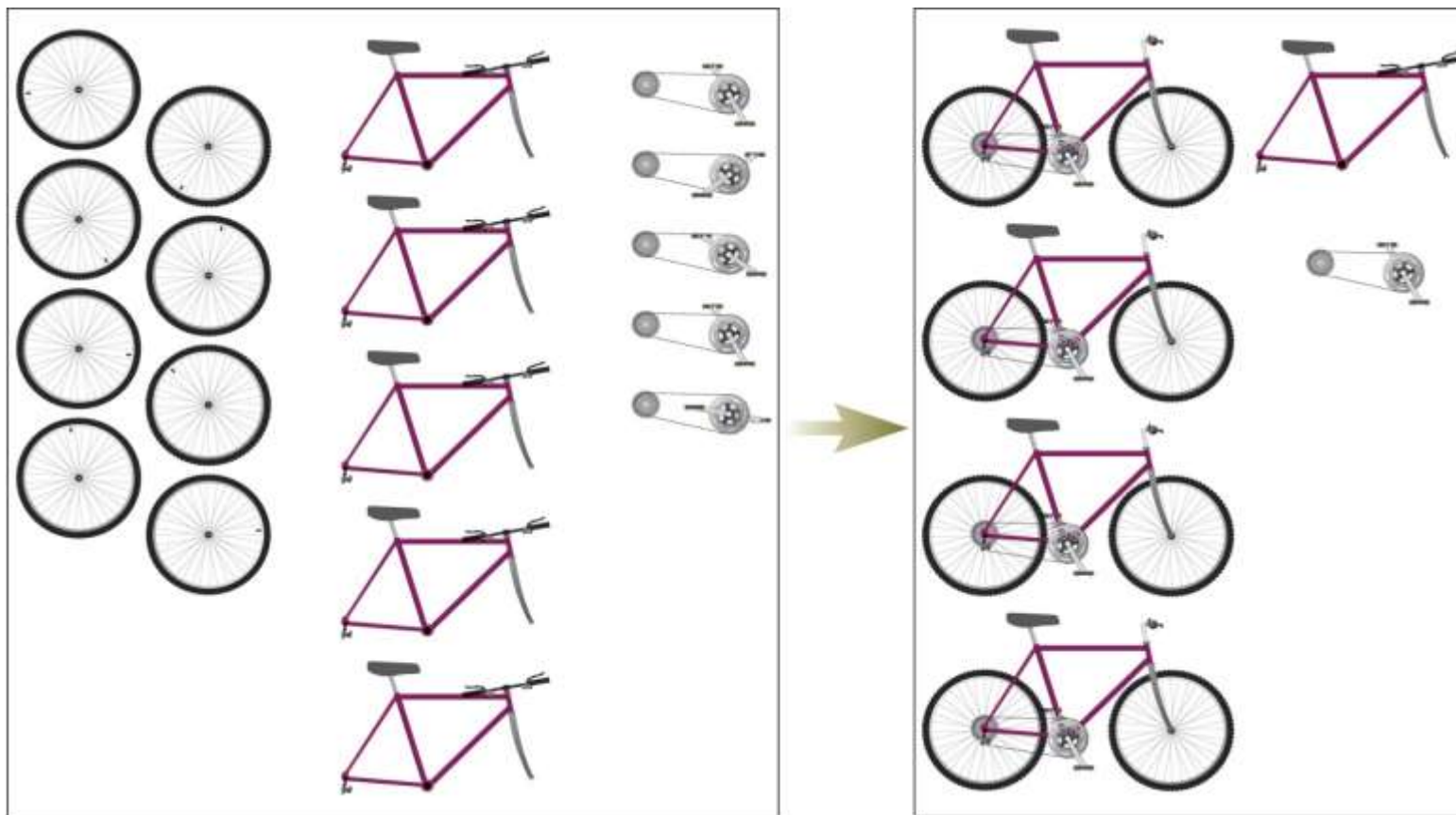
Objective

You will begin to use and practice various applications of limiting reagents

Discuss what is needed to finish science fair projects

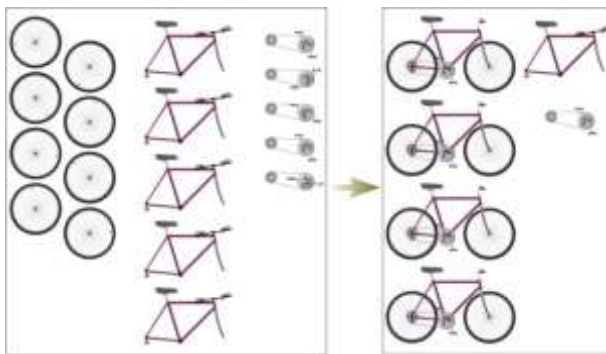
Limiting Reagent

The reactant that is completely consumed by the reaction.



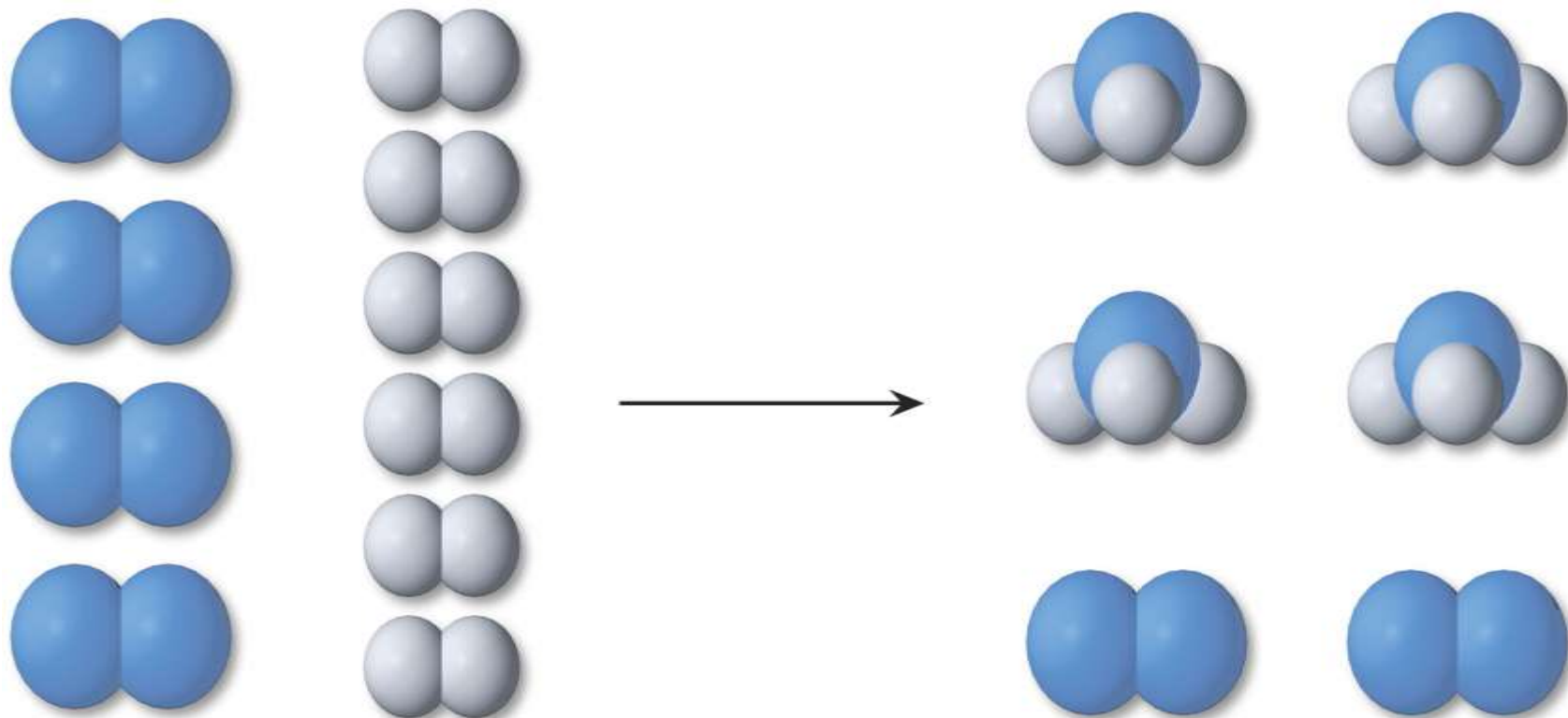
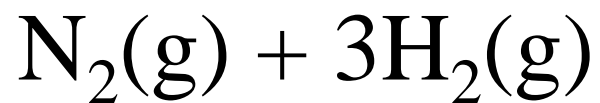
Limiting Reagent

The reactant that is completely consumed by the reaction

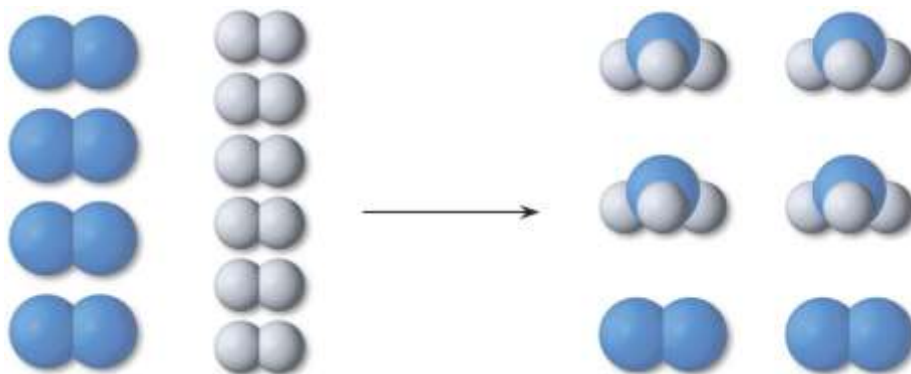


The number of bicycles that can be assembled is limited by whichever part runs out first. In the inventory shown in this figure, wheels are that part.

Limiting Reagent



Limiting Reagent



A molecular view of a Limiting reactant situation for the ammonia synthesis. To make 4 molecules of NH_3 requires 2 molecules of N_2 & 6 molecules of H_2 . If we start with 4 molecules of N_2 and 6 molecules of H_2 , H_2 is the limiting reactant.

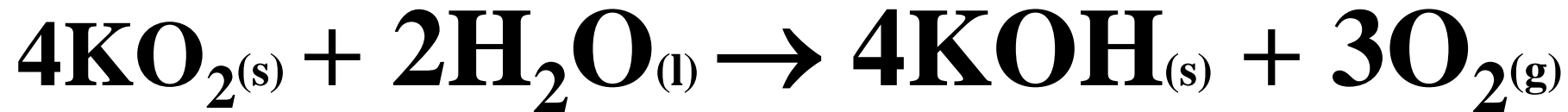
Limiting Reagent

So to find limiting reagents carry out the stoichiometry for each of your reactants that you are given a quantity for.

The reactant that gives you the smallest value of product is your limiting reagent.

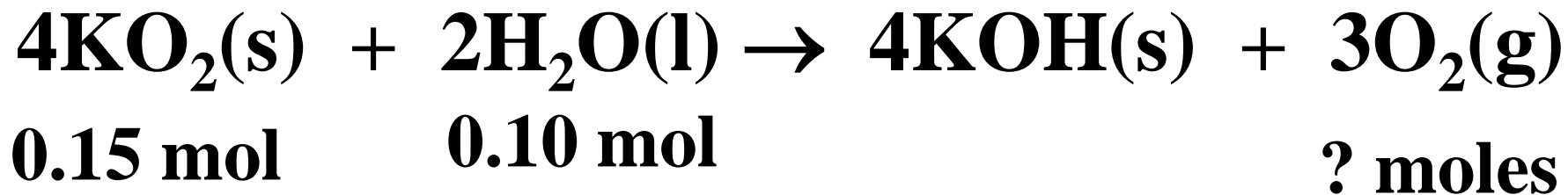
Use this reactant for all calculations

Limiting Reagent



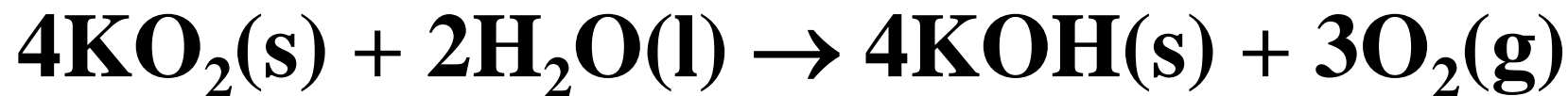
a. How many moles of O_2 can be produced from 0.15 mol KO_2 and 0.10 mol H_2O ?

b. Determine the limiting reactant.



Limiting Reagent

b. Determine the limiting reactant.



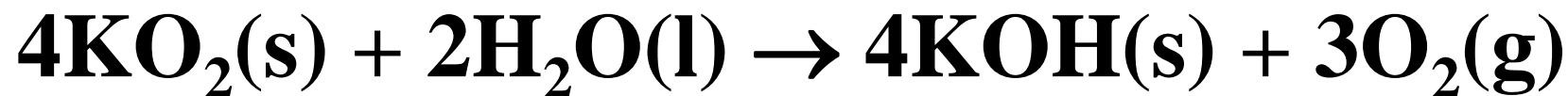
0.15 mol 0.10 mol ? moles

Based on **KO₂** :

$$0.15 \text{ mol } \cancel{\text{KO}_2} \times \frac{3 \text{ mol } \text{O}_2}{4 \cancel{\text{mol KO}_2}} = 0.1125 \text{ mol } \text{O}_2$$

Limiting Reagent

b. Determine the limiting reactant.



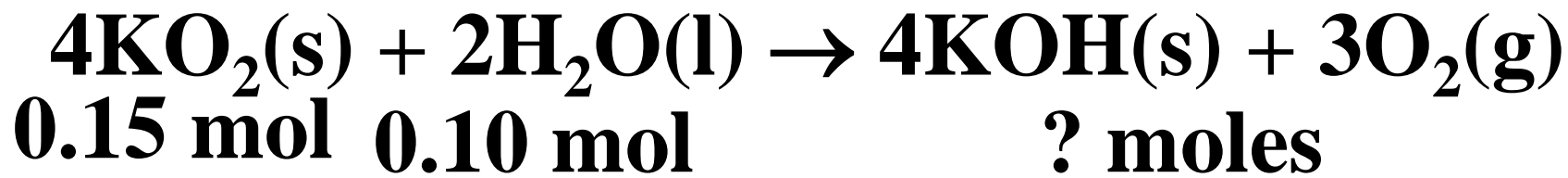
0.15 mol 0.10 mol ? moles

Based on H_2O :

$$0.10 \text{ mol } \text{H}_2\text{O} \times \frac{3 \text{ mol } \text{O}_2}{2 \text{ mol } \text{H}_2\text{O}} = 0.15 \text{ mol } \text{O}_2$$

Limiting Reagent

b. Determine the limiting reactant.

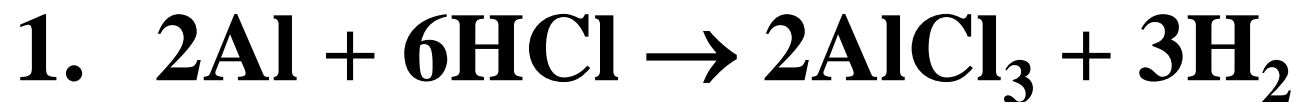


Based on KO_2 : = 0.1125 mol O_2

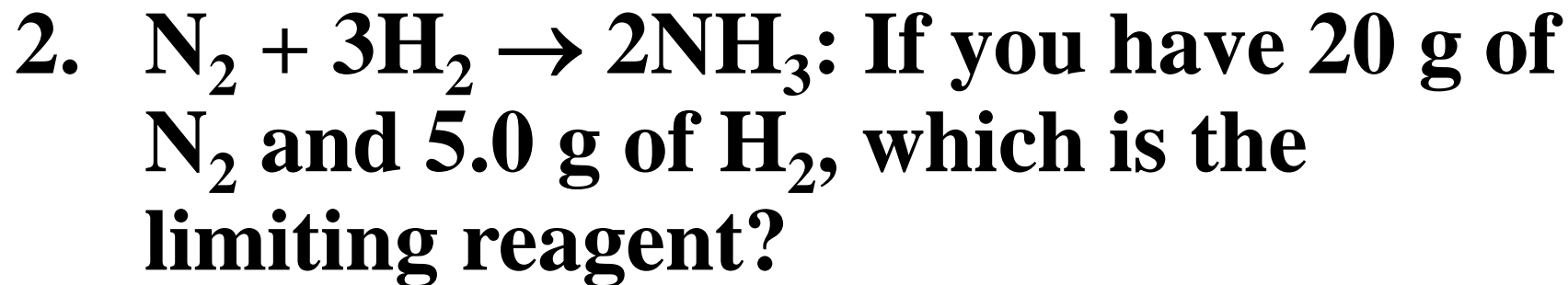
Based on H_2O : = 0.15 mol O_2

KO_2 is the limiting reagent because it limited the amount of O_2 that could be produced. H_2O is the excess reagent.

Practice questions



If 25 g of aluminum was added to 90 g of HCl, what mass of H_2 will be produced?



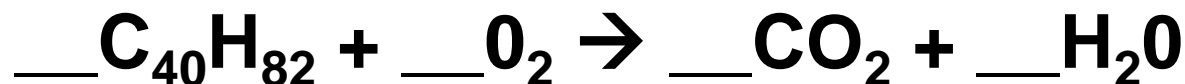
Practice questions

2. $\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$: If you have 20 g of N_2 and 5.0 g of H_2 , which is the limiting reagent?
3. What mass of aluminum oxide is formed when 10.0 g of Al is burned in 20.0 g of O_2 ?

Bell Work

16-Feb-2017

Candle wax reacts with oxygen to form water and carbon dioxide through the following chemical reaction:



- 1. Balance the equation**
- 2. If there is approximately 1.1 g of oxygen in the container and the mass of the candle is 0.8 g what is the limiting reagent for this reaction (MM C₄₀H₈₂ = 562 g/mol)?**

EQ: How do limiting reagents impact your daily life?

Objective

You will practice finding limiting reagents and determining theoretical yield of simple chemical reactions

Discuss Science fair Data analysis (brief)

Quick Quiz #2.3

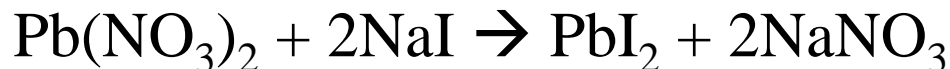
When lead (II) nitrate reacts with excess sodium iodide producing lead (II) iodide and sodium nitrate a yellow precipitate is formed.



1. What are the molar masses of **PbI₂** and **NaI**?
2. If 5.0g of **NaI** reacted with excess **Pb(NO₃)₂** how many moles of **NaI** are there?
3. What is the molar ratio between **NaI** and **PbI₂**?
4. What is the theoretical yield of **PbI₂** based on the information above in grams?

Quick Quiz #2.3

When lead (II) nitrate reacts with excess sodium iodide producing lead (II) iodide and sodium nitrate a yellow precipitate is formed.



461g/mol

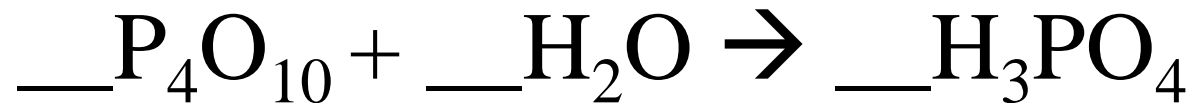
1. What are the molar masses of **PbI₂** and **NaI**? **150g/mol**
2. If 5.0g of **NaI** reacted with excess $\text{Pb}(\text{NO}_3)_2$ how many moles of **NaI** are there? **0.033mol NaI**
3. What is the molar ratio between **NaI** and **PbI₂**? **2:1**
4. What is the theoretical yield of **PbI₂** based on the information above in grams? **7.7g PbI₂**

Turn in

- Work Sheet for Basic Stiochiometry
(period 1)

Bellwork

17.Feb.16



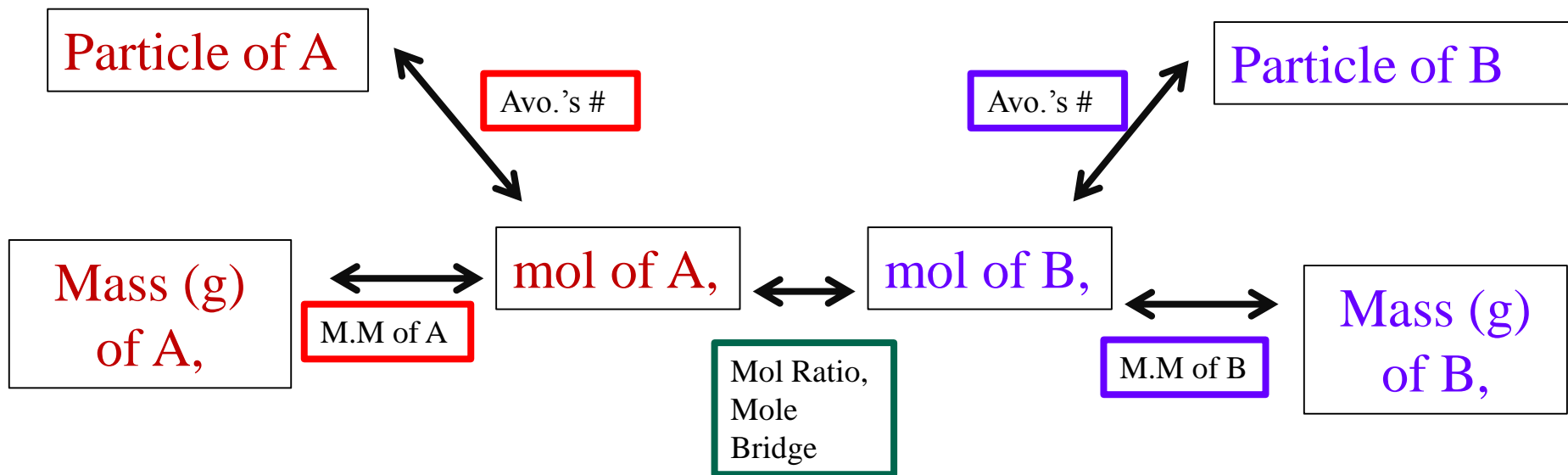
1. 50 grams of P_4O_{10} (M.M. 284g/mol) reacts with 52 grams of water (M.M. 18g/mol) how much phosphoric acid (M.M. 98g/mol) will be produced (grams)?
- ~~2. How much excess reagent is left after the reaction is complete?~~

EQ: How do limiting reagents impact your daily life?

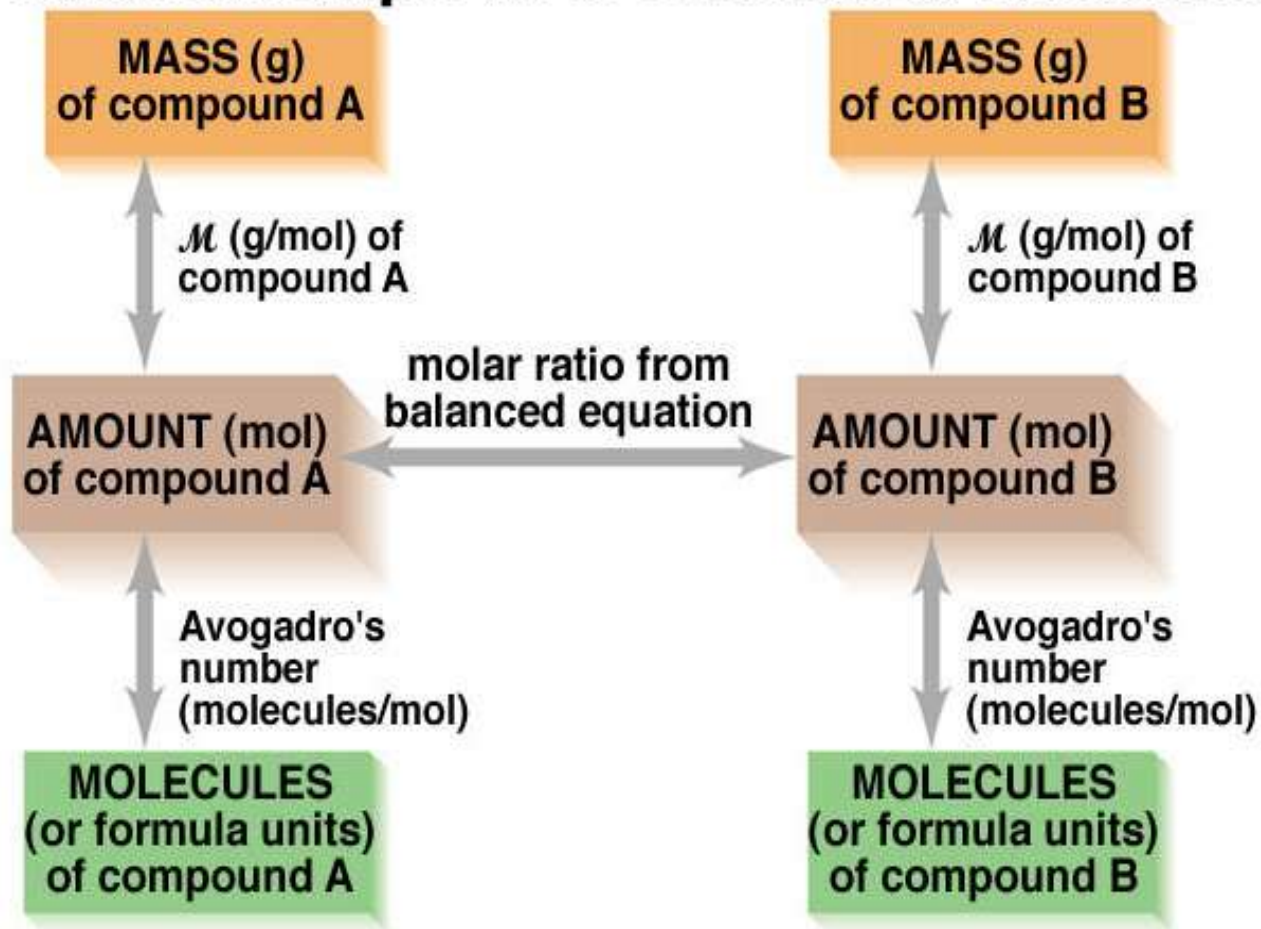
Objective

You will see practice limiting reagents
calculation in small groups

Stoichiometry Flow Chart



Summary of the Mass-Mole-Number Relationships in a Chemical Reaction



Homework 17-Feb-17

- Finish 1, 3, 4, 5, and 6 form Limiting Reagents Tutorial
- Science Fair Graphs and Conclusions

Bell Work

20-Feb-2017

What is the difference between a limiting and non-limiting reagent?

For the balanced equation shown below how much non-limiting reagent would remain if 26.0g of C₃H₉N reacted with 46.3g of O₂?



EQ: What is left over after everything else has run out

Objective

You will see limiting reagents in the lab

Limiting Reagent Lab

You will work in groups of at your lab bench

The molar ratio will be:

4people
6rxns

Or **4people**
6balloons

Limiting Reagent Lab

Person A mass out of NaHCO_3

Person B help Person D Clean
and dry all test tubes, **do not
over use paper towels!**

Person C will use a 10mL
graduated cylinder to obtain
the $\text{HC}_2\text{H}_3\text{O}_2$

Limiting reagents
are so easy! I
figured it out, even
after pooping my
pants



Before you go

List the steps you would use to determine how to find the amount of the non-limiting reagent that is left over from a reaction.

Bell Work

21-Feb-2017

For the balanced equation you got a 75% yield in the production of NO_2 (M.M. 46g/mol) from 16.0g of $\text{C}_3\text{H}_9\text{N}$ (M.M. 59g/mol) reacted with excess O_2 , what was the mass of NO_2 you produced?



EQ: What is left over after everything else has run out

Objective

You will put your science fair board together
in the

Bellwork

22.Feb.2017

1. What are indicators of a chemistry problem being a limiting reagent based calculation?
2. In five or less steps list the method for determining the amount of excess reagent left over in a reaction.

Agenda

Limiting Reagent Baking Soda and Vinegar

Objective

Use visual indicators to determine LR and compare to theoretical get more practice with calculations involving limiting and excess reagents

Limiting Reagent Lab



- How did you determine the limiting reagent?
- Was the $\text{HC}_2\text{H}_3\text{O}_2$ always the limiting reagent?
- What issues arose in the experiment?

Limiting Reagent Lab

- How did you determine the limiting reagent?
- Was the $\text{HC}_2\text{H}_3\text{O}_2$ always the limiting reagent?
- What issues arose in the experiment?

Percent mass by volume

% (m/v) Xg/100mL,

Example:

If a solution is 3%(m/v) we will consider it to be 3g/100ml, so for a 3% HCl solution that is 5mL you can get grams of HCl by the following:

$$\frac{5\text{mL}}{1} \times \frac{3\text{g}}{100\text{mL}} = 0.15\text{g HCl}$$

Due 27.Feb.17

- Limiting Reagent Lab

Before you go

List the steps you would use to determine how to find the amount of the non-limiting reagent that is left over from a reaction.

Bell Work

27-Feb-2017

What have you done to master Stiochiometry Calculations?

How can you identify a rxn is a limiting reagent rxn?

EQ: Why is sharing research findings
a key stone to good science?

Objective

You will put together a short PowerPoint presentation covering your science fair project and sharing your findings.

Quick Quiz #2.4

On a new piece of paper you **WILL** correctly answer the following questions.

(**I KNOW** each of you can do this!)

Number your paper 1-3
SKIPPING 4 lines each time

Show all work (dimensional analysis) and circle your answers 😊

You will have **15 min**

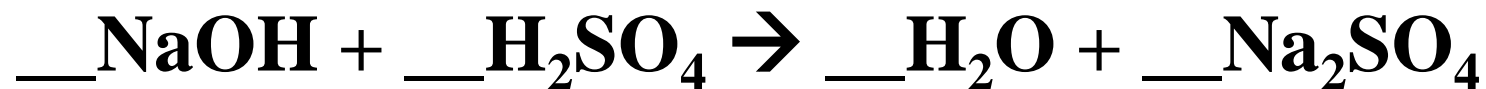
$\overline{8}$ Quick Quiz #2.4 Name

1

2

3

Quick Quiz #2.4

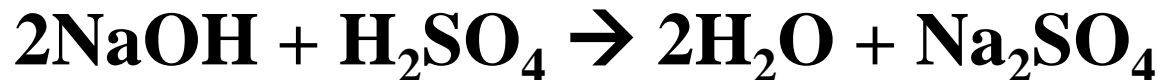


- 1. How many grams of NaOH are needed to form 4moles of water?**
- 2. What mass of Na₂SO₄ is formed from 25g of NaOH reacting with 20g of H₂SO₄?**
- 3. Write the formulas of the following compounds:**

Titanium (I) oxide

Aluminum Sulfide

Quick Quiz #2.4



1. How many grams of NaOH are needed to form 4 moles of water? 1 point
2 point

$$4 \text{ mol H}_2\text{O} \times \frac{2 \text{ mol NaOH}}{2 \text{ mol H}_2\text{O}} \times \frac{40\text{g NaOH}}{1 \text{ mol NaOH}} = 160\text{g NaOH}$$

2. What mass of Na_2SO_4 is formed from 25g of NaOH reacting with 20g of H_2SO_4 ?

$$20\text{g H}_2\text{SO}_4 \times \frac{1 \text{ mol H}_2\text{SO}_4}{98\text{g H}_2\text{SO}_4} \times \frac{1 \text{ mol Na}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \times \frac{142\text{g Na}_2\text{SO}_4}{1 \text{ mol Na}_2\text{SO}_4} = 29.0\text{g Na}_2\text{SO}_4$$

1 point

3. Write the formulas of the following compounds:



1 point each

Sci. Fair. ppt.

- Homework section of the class website ppt. template for format of presentations.
- One (1) Presentation per team
- Use provided template but entire presentation should be fourteen (14) or less slides.
- Presentation should be between 1:45-2min long.
- Include work cited page and citation with every picture.

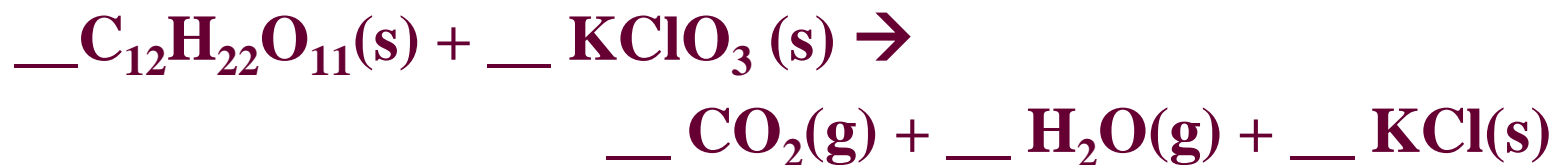
Sci. Fair. ppt. cont.

- Email a pdf. copy of your presentation to Mr. Golden by **8:15am on the 1st of March 2017.**
- Save pdf. as Partners first and last name example, **“JoeSchmoe&AllyBally.P1SciFair1617”**
- Properly formatted email, 1 per group with subject line as follows: Partner first and last name with period example, **“JoeSchmoe&AllyBally.P1SciFair1617”**
- You will present in class on the 1st of March.

Bell Work

28-Feb-2017

a. Balance me!



b. What mass of potassium chlorate (MM 122g/mol) is need to react with 1.2g of sucrose (MM 342g/mol)?

EQ: Why is sharing research findings
a key stone to good science?

Objective

You will understand and practice various
applications of limiting reagents

Missing Mass Gas Lab



Data From “Missing Mass Gas Lab”

Period 1	grams
Mass of crucible	
Mass of Sucrose	
Mass of KClO_3	
Mass of Crucible and product	

Period 2	grams
Mass of crucible	7.20
Mass of Sucrose	1.11
Mass of KClO_3	3.14
Mass of Crucible and product	7.18

Period 3	grams
Mass of crucible	7.11
Mass of Sucrose	1.08
Mass of KClO_3	3.13
Mass of Crucible and product	

Bell Work

1.Mar.2017

Please get out your usb drive with your Science Fair ppt. or queue at Mr. Golden's computer to load your cloud file for presentations.

While you are waiting or after you have loaded it, prepare you Limiting Reagent Tutorial sheets #2 and #3 to turn in. ☺

EQ: Why is sharing research findings
a key stone to good science?

Objective

You will present your research finding and
learn about others

Science Fair Presentations

Limiting Reagent Practice #2

Credit given only when all work is shown.

Must complete problems #1-6 on p.2 and ONE of the problems from p.3 in order to go to the science fair

I have provided the answers to each problem. Use them to check your work only

Limiting Reagents Practice

In small groups complete

Bell Work

2-Mar-2017

You will need the following:

- **Blank piece of paper**
- **Calculator**
- **Pencil**
- **Green Sheets**

EQ: Why is sharing research findings
a key stone to good science?

Objective

You will show of your stiochiometry skills

Home Work, Due 6 March

Data From "Missing Mass Gas Lab" Post lab

Period 1	grams
Mass of crucible	7.15
Mass of Sucrose	1.02
Mass of KClO_3	3.15
Mass of Crucible and product	8.21

Period 2	grams
Mass of crucible	7.20
Mass of Sucrose	1.11
Mass of KClO_3	3.14
Mass of Crucible and product	8.18

Period 3	grams
Mass of crucible	7.11
Mass of Sucrose	1.08
Mass of KClO_3	3.13
Mass of Crucible and product	8.43

Bell Work

29.Jan.2015

25 student walk into a room where the teacher hands out 13 extra credit slips. If the rxn is



- What is the limiting reagent?
- What is the non-limiting reagent?
- How much non-limiting reagent is left over?

EQ: How do limiting reagents impact your daily life?

Objective

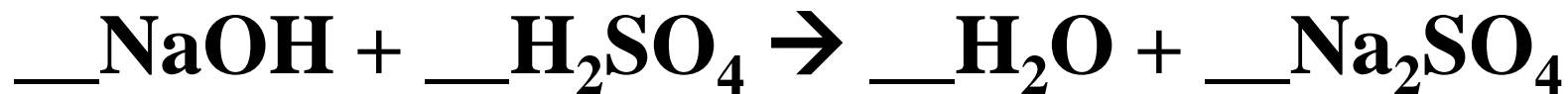
You will have prepare a known molarity (mol/L) solution for use as a fire retardant.

S'mores'

You can practice your stoichiometry skills in the lab with a food chemistry lab **ONLY** if you have all your review sheet completes and ready to turn in ☺.

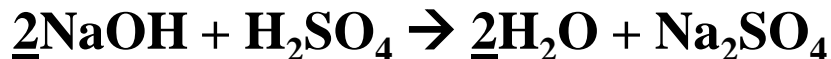
Hand forward the following
Limiting Reagent Lab

Quick Quiz SHOW ALL WORK



- 1. Find moles of H_2O formed from 2moles of H_2SO_4 ?**
- 2. Find grams of NaOH needed to form 4 moles of water?**
- 3. How many grams of Na_2SO_4 will be formed if you start with 5moles of NaOH?**
- 4. What mass of H_2SO_4 is needed to form 25 grams of H_2O ?**
- 5. Write the formulas of the following elements:
Titanium (II) oxide Phosphorous trichloride**

Quick Quiz



1. How many moles of water are formed by 2 moles of H_2SO_4 ?

$$2 \text{ mol } \text{H}_2\text{SO}_4 \times \frac{2 \text{ mol } \text{H}_2\text{O}}{1 \text{ mol } \text{H}_2\text{SO}_4} = 4 \text{ mol } \text{H}_2\text{O}$$

2. How many grams of NaOH are needed to form 4 moles of water?

$$4 \text{ mol } \text{H}_2\text{O} \times \frac{2 \text{ mol } \text{NaOH}}{2 \text{ mol } \text{H}_2\text{O}} \times \frac{40 \text{ g } \text{NaOH}}{1 \text{ mol } \text{NaOH}} = 160 \text{ g } \text{NaOH}$$

3. How many grams of Na_2SO_4 will be formed if you start with 5 mol of NaOH?

$$\frac{5 \text{ mol } \text{NaOH}}{1} \times \frac{1 \text{ mol } \text{Na}_2\text{SO}_4}{2 \text{ mol } \text{NaOH}} \times \frac{142 \text{ g } \text{Na}_2\text{SO}_4}{1 \text{ mol } \text{Na}_2\text{SO}_4} = 355 \text{ g } \text{Na}_2\text{SO}_4$$

4. What mass of H_2SO_4 is needed to form 25 grams of H_2O ?

$$25 \text{ g } \text{H}_2\text{O} \times \frac{1 \text{ mol } \text{Cu}}{18 \text{ g } \text{H}_2\text{O}} \times \frac{1 \text{ mol } \text{H}_2\text{SO}_4}{2 \text{ mol } \text{H}_2\text{O}} \times \frac{98 \text{ g } \text{H}_2\text{SO}_4}{1 \text{ mol } \text{H}_2\text{SO}_4} = 68 \text{ g } \text{H}_2\text{SO}_4$$

5. Write the formulas of the following elements:

TiO and PCl_3

Bell Work

15/Feb/16

Please clear your desks for our test! All you need is a periodic table, stoichiometry flow chart, pencil and a calculator

Another one

You are given a 5 gallon jug and a 3 gallon jug in front of a fountain. Measure out exactly 4 gallons of water.

Objective

**You will APPLY your KNOWLEDGE
of Stiochiometry**

Agenda

1. Continue working on limiting reagent worksheets (one more!)

1. Cut out tissue paper for chinese lanterns

Remember...

$$\text{gram A} \times \frac{1 \text{ mol A}}{\text{MM A}} \times \frac{\text{mol B}}{\text{mol A}} \times \frac{\text{MM B}}{1 \text{ mol B}} = \text{grams B}$$

When You Finish

HW:

Read 451 – 457

Be prepared to discuss Kinetic molecular
Gas Theory

EXIT SLIP

If this test were out of 30 points what score do you think you got today?

Why?

What can you do for the next test to improve this score?

Bell Work

02-05-2016

$$2 \text{ GC} + 1 \text{ M} + 3 \text{ CP} \rightarrow 1 \text{ SM}$$

GC = graham cracker

M = marshmallow

CP = chocolate pieces

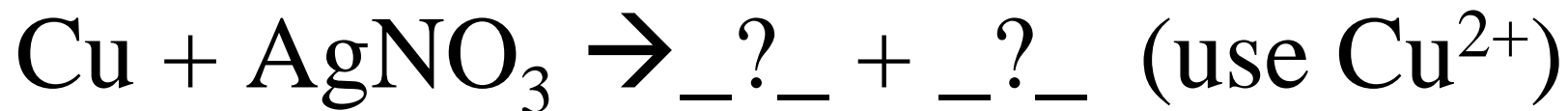
SM = s'more

1.) How many of each ingredient is needed to make s'mores for a class of 20 students?

2.) How many s'mores can you make with 85 chocolate pieces?

Bell Work

26-Jan-2015



- (1) Balance the equation.
- (2) How many grams of silver are formed from 2.0 grams of copper?
- (3) How many grams of silver are formed from 2.0 grams of silver nitrate?